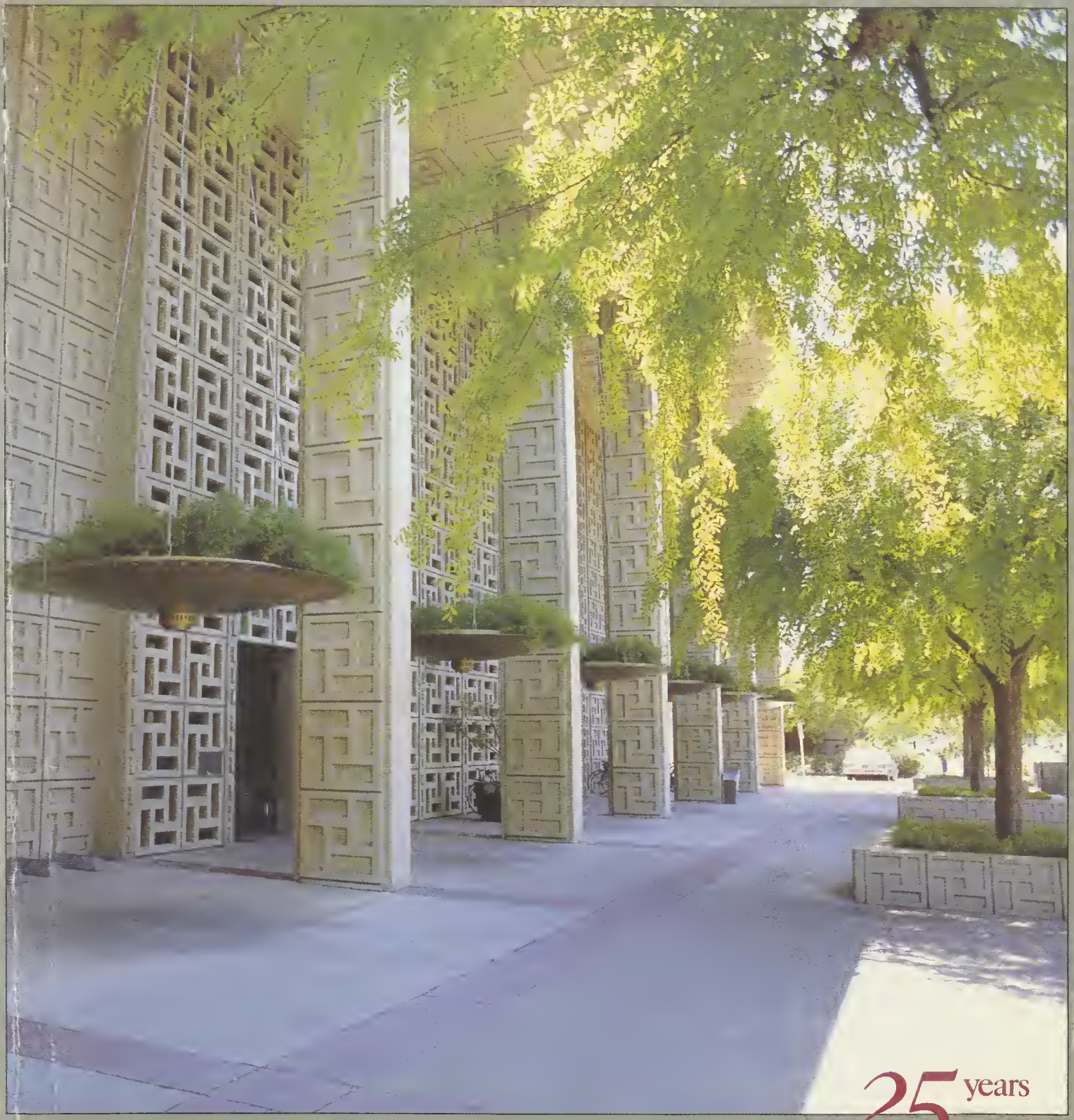
Stanford University Medical Center



25 years

25 YEARS OF DISCOVERY

September 1984 marked the 25th Anniversary of the relocation of the clinical programs of the medical school to the Stanford campus after 51 years of existence in San Francisco. The event provides a suitable opportunity to express our deep appreciation to the university trustees and administration, the faculty, staff and students, and the many friends whose collective support and encouragement over the years have made the school and the Stanford University Medical Center possible.

As the articles on these pages show, the past 25 years have been truly years of achievement in science, clinical medicine and medical education. The school has led the way in providing an education that traditionally and consistently has been excellent. This tradition has been challenged throughout the years by changes in society and in the medical profession itself, as well as the school's geographic location, physical facilities, administrative policies, curriculum and, of course, faculty and students. Like all medical schools that are a part of large academic medical centers, Stanford faces new challenges brought about by pressures on society. Some of the issues include the increasing scarcity of funds available to support medical education, government regulation and trends revising the way medical services are delivered to the public and paid for.

But I am certain that both the school and the medical center will rise to the challenges as long as they remain part of the university and are dedicated to their fundamental missions of discovery, dissemination of knowledge and the education of future generations of professionals, scholars and citizens.

When the medical center was dedicated in 1959, it was based on these principles summarized below:

"To bring together under one roof a full time faculty in the basic and clinical sciences to advance medical knowledge.

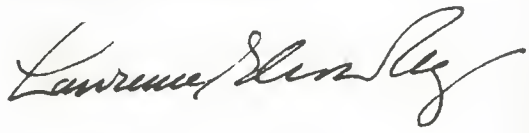
"That the future progress of the medical sciences is inextricably linked with progress in social sciences as well as biological sciences and that opportunities for enrichment would be enhanced by integrating medicine with the university.

"To develop a new program of education that provides medical students with sufficient time and opportunity to carry out scholarly research programs outside of the usual medical school classes.

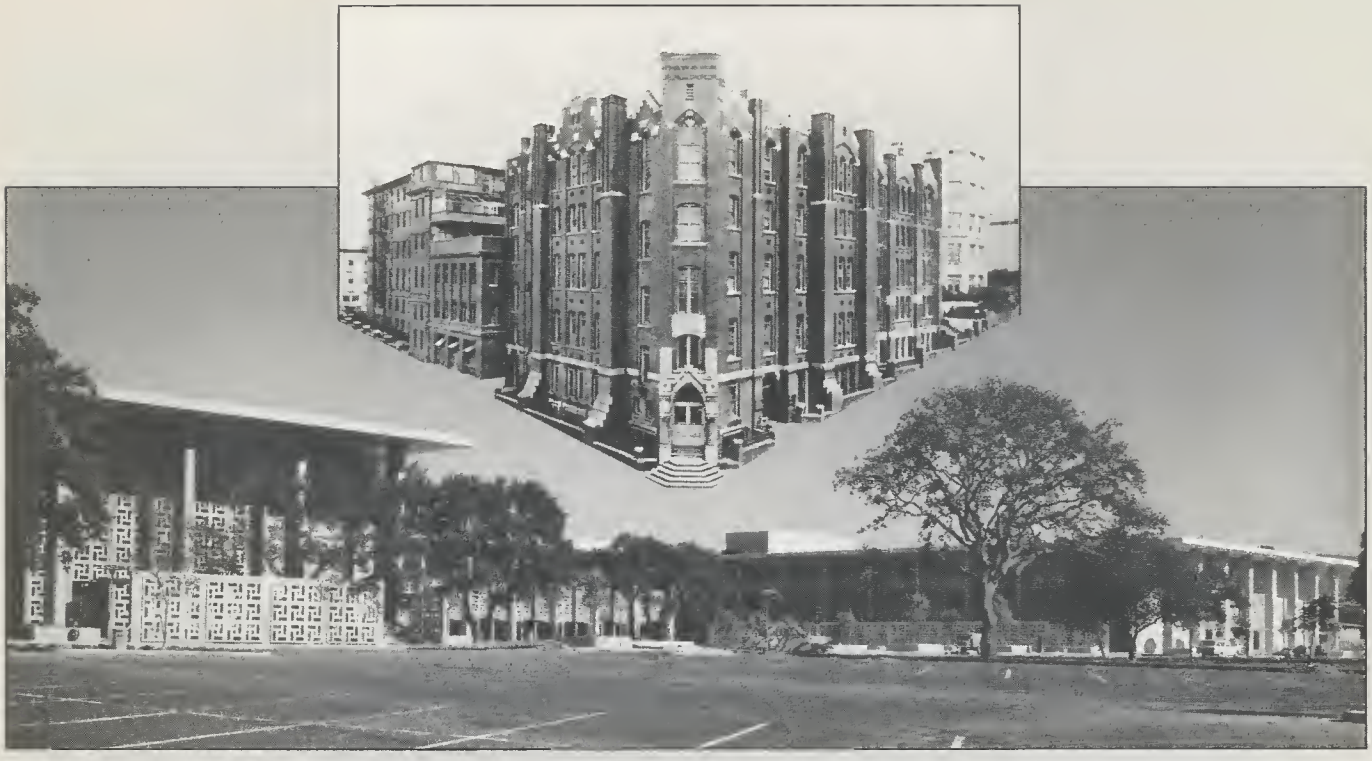
"To provide the opportunity to apply discoveries from the laboratory to clinical care.

"To provide examplary patient care in a teaching hospital environment both to the citizens of Palo Alto and nearby communities and to those patients referred for specialized care."

The object of the Anniversary celebration is to rededicate the Stanford University Medical Center to these principles.



Lawrence G. Crowley, M.D.
Vice President for Medical Affairs
& President, Stanford University Hospital



A NOVEL CURRICULUM AT CENTER STAGE

by Spyros Andreopoulos

An important event associated with the formal dedication of the Stanford University Medical Center was the address delivered on September 17, 1959, by Frank Stanton, then president of the Columbia Broadcasting System.

The address was given under rather difficult circumstances. An unexpected rainstorm blew in from the Pacific, forcing the ceremony, originally scheduled to be held in the open area before the spraying fountains, to be moved indoors. There was an audience of about 2,000 people, and when Stanton began to talk on "Medicine for a New Age" one could have heard a pin drop. At the end of his speech, amid the enthusiastic applause of the crowd, Stanton made his way to the area where Stanford University President J. Wallace Sterling and dignitaries were seated and received their warm congratulations.

These were the words with which Stanton so impressed the audience in Palo Alto 25 years ago:

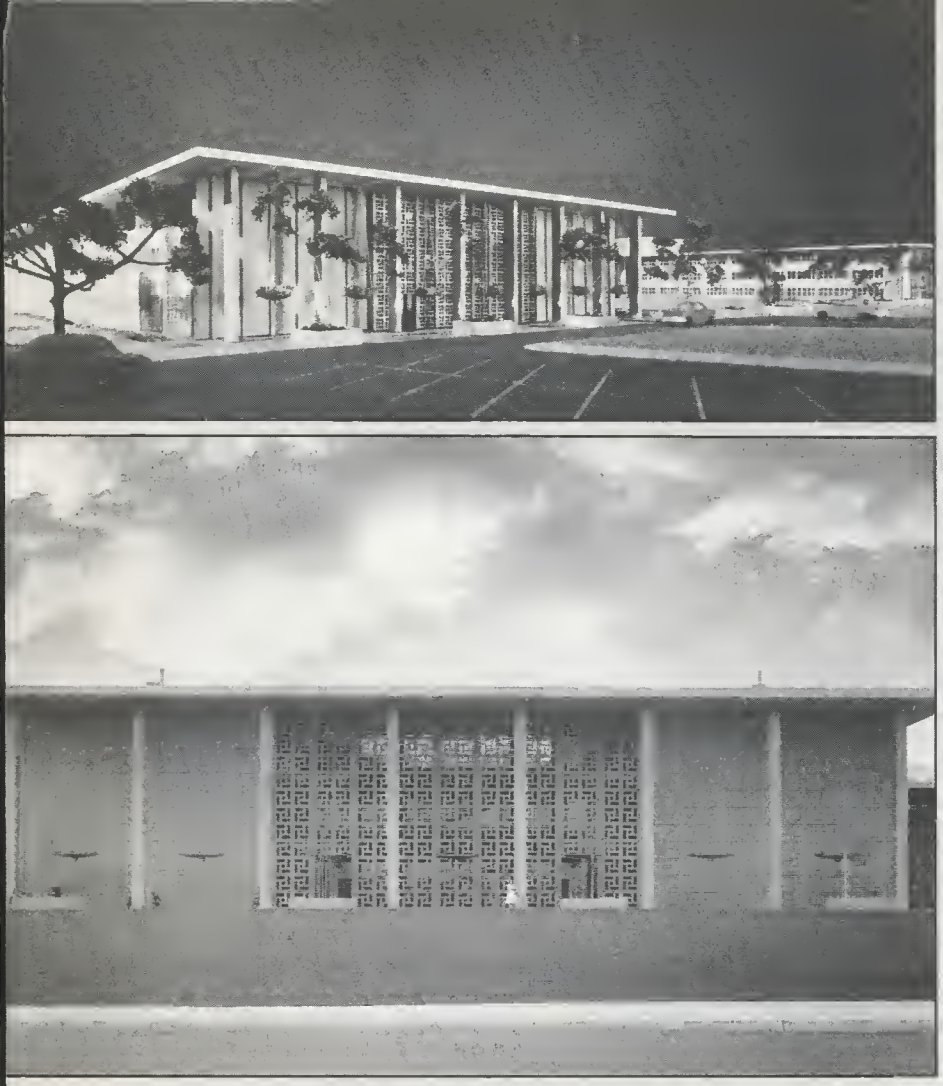
"Today we face the dangerous situation that one half of the world does not know what the other half is up to....So serious is the splintering of knowledge that within one discipline there may be misunderstandings and distortions. "The medical man of the future cannot do everything by himself....By uniting the medical school with the rest of the university, knowledge in the field of medicine and in the related biological, physical and behavioral sciences will be extended, more largely integrated, and focused on our understanding of health and illness.

"Here on the rim of the Pacific we are witnessing the beginning of a great contribution."

What Stanton foresaw signaled the end of the academic double life students had led ever since Stanford University began teaching medicine in 1909 in San Francisco.

At the university campus in Palo Alto, they had learned anatomy, biochemistry, microbiology and physiology. At the Stanford Hospital on Clay and Webster Streets in San Francisco, they had studied pharmacology and pathology, and they did their clinical work under a faculty of topflight but largely part-time local physicians and surgeons in private practice.

When Stanford's handsome new $27-million medical center complex (complete with 434-bed hospital and outpatient clinics) formally opened, students considered it an unqualified blessing. They could now fulfill their degree requirements without commuting to an-



Edward Durell Stone's drawing (top) of how Stanford University Medical Center might look is contrasted with the finished Edwards Building (bottom).

Medical center construction began in 1957 and was completed in 1959. The formative stages of the hospital's east wing with core building can be seen.

other campus. But in San Francisco medical circles at the time, the center was an object of much concern.

At the hub of the argument was Stanford's dean of the School of Medicine, pediatrician Robert Alway. At 54, he was a hard-driving administrator whose passionate interest was to improve the school. Alway was also a man of tough, direct methods. When he was chosen as dean in 1958, medical school department chairmen submitted their resignations as a matter of course. Customarily, new deans refuse. Not Alway.

On the theory that the old Stanford had been weakened by too much scholastic inbreeding (some department chairmen and faculty had simply floated to the top on the strength of longevity), Alway went scouting for new talent. He quickly recruited a dazzling array of men for top jobs—pediatrician Norman Kretchmer from Cornell, Nobel Prize winning biochemist Arthur Kornberg (along with almost his entire department) from Washington University, Nobel Prize winning geneticist Joshua Lederberg from the University of Wisconsin, immunologist Halsted Holman from Rockefeller University, hand surgeon Robert Chase from Yale, psychiatrist David Hamburg from the National Institutes of Health.

Joining them were two other big Stanford names who had been already in San Francisco, pharmacologist Avram Goldstein and radiologist Henry Kaplan. Alway also replaced three department chiefs, created a new department of genetics, and added new full professors.

Almost overnight Stanford medical school was catapulted to national prominence. The school began to attract a medical faculty whose talents and prestige enabled them to bring in funds as well as a measure of independence.

The men who were replaced were understandably bitter. None were more so than the staff of the old San Francisco hospital and most of the medical alumni. Their loyalties were with the old school and those professors who believed the talent available in the suburbs would offer no match for what Stanford had left behind in San Francisco.

The medical leaders at Stanford disagreed, pointing out that under its new curriculum, full-time salaried faculty and its proximity to the university, the school would be better able not only to teach the best methods of caring for patients, but aim to increase knowledge and benefit the whole world by its diffusion.

Inspired by a program undertaken originally by

Dean Robert Alway stands before a portrait of Samuel Elias Cooper symbolizing the link between past and present. Cooper founded the far West's first medical school, Stanford's forerunner.

Cleveland's Western Reserve University, Stanford's "Five-Year Plan for Medical Education" was designed to humanize the physician by spreading medical studies over five years instead of four, teaching students about the patient as a whole and emphasizing principles rather than the detailed mastery of subjects. The latter was important, the curriculum's designers emphasized, "because medical frontiers were advancing so rapidly that comprehensive coverage of all areas was impractical."

Medical school freshmen began with wide-ranging courses that related to basic medical disciplines. And students were encouraged to supplement their medical education with independent study or elective courses in areas which particularly interested them. By providing generous amounts of free time each year, students could do research or study related subjects such as sociology and psychology, or work for degrees in other university departments while earning the medical degree.

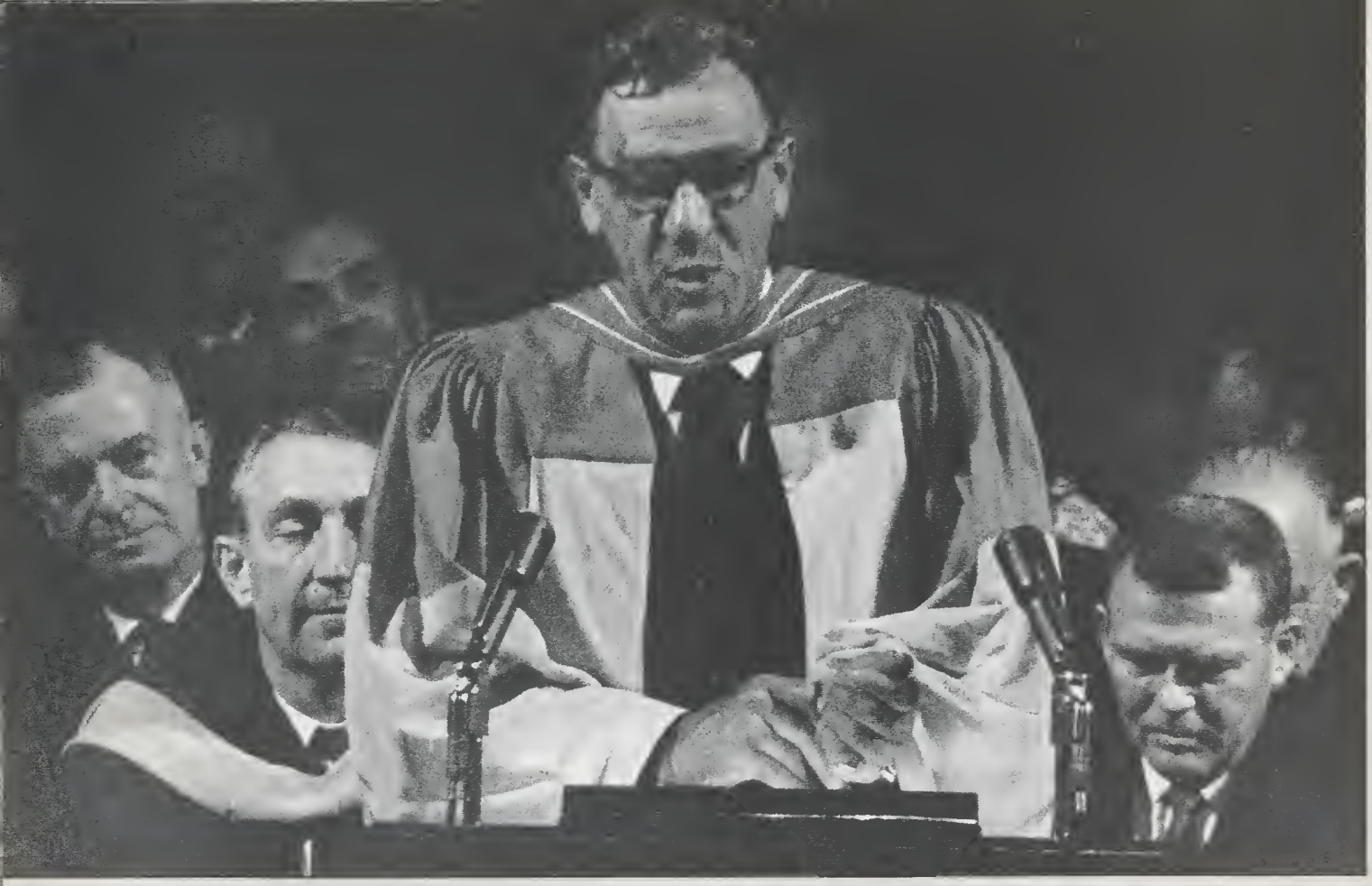
There were those, of course, who feared that because medical education was already too long, the five-year program might price Stanford's new school out of the market. "But when the first class was admitted in 1959," recalls Goldstein, "it was greatly overapplied."

Goldstein, one of the chief architects of the five-year plan, maintains he is no curriculum tinkerer. "There's a pendulum about curriculum, an urge to keep changing it back and forth," he says. "But curriculum is much less important than the quality of the institution and its teachers and researchers. Nevertheless, the five-year program was important because it suggested that Stanford, unlike most schools that turn out primarily practicing physicians, could attract an entirely new kind of medical student.

"The thinking behind it was that we would expand the time in which students were exposed to the basic sciences because we perceived the new era of medicine as one in which science would change almost everything."

"By any yardstick, we've had the most stimulating medical students year after year," says Eugene Farber, an internationally noted expert on skin disease and chairman of dermatology. Farber, who moved to Palo Alto from San Francisco, speaks with equal enthusiasm about former Stanford medical graduates he has encountered as interns and residents at Stanford hospital. "This may sound trite," he explains, "but whenever I meet them I feel like I am with eagles."

Irving Weissman, professor of pathology and himself a product of the five-year curriculum, surveyed his



Flanked by David Packard (left), board of trustees chairman, and William Hewlett, hospital board chairman, president J. Wallace Sterling begins dedication ceremonies.

classmates of 1965 seven years ago. Their unanimous verdict: it was a remarkably successful experiment in medical education.

"The five-year plan served students very well, irrespective of their eventual career choices," Weissman wrote. "Although the class...was certainly an anomaly in terms of the high percentage of its graduates who ended up in investigational and teaching roles (67 percent), the satisfaction expressed...indicates that the program was compatible with the ambitions of diverse medical students."

An important plus of the five-year program was to provide students from the moment of admission with a home base laboratory. "We believed in research," explains Goldstein, "and you can't do serious research on the basis of a few hours here or there. The Fleischmann Laboratories were built to avoid the footloose, shiftless system of operation that we knew existed in most medical schools where students drifted from one classroom to another without a sense of belonging anywhere."

The student labs, open day and night, also decreased the burden on departmental laboratories usually pressed for space.

Stanford's experiment in medical education was in effect for 10 years when it came abruptly to an end.

Weissman maintains it was prematurely aborted on the basis of a few crucial decisions: the development and sale of a four-year track to incoming students, a decision to charge five-year students higher tuition than four-year students, pressure through capitation support by the federal government to increase the class size because of a predicted shortage of doctors, and the mistaken notion that a small faculty could increase its teaching and administrative load.

The reasons for the demise, Goldstein thinks, were far more complex. They included the "student cultural revolution of the 1960s with its heavy antiscience thrust and anti-intellectualism, misplaced egalitarianism and loss of interest among the students of that era in laboratory research."

These ideas, according to Goldstein, also infected many members of the faculty, and the five-year plan was replaced by an entirely elective curriculum.

"As soon as the curriculum became optional for students, it became optional for the faculty as well, coupled with a decline of interest in teaching," Goldstein observes.

And the crunch for laboratory space forced the school to divert most of the student laboratories to departmental use.

But in the past few years, a series of faculty senate actions were taken, led by Goldstein, to steer the school back to the path blazed in 1959. They define the mission of the school as that of "providing an educational environment that encourages intellectual stimulation and opportunity for self-motivated students who are interested in developing a scholarly investigative approach to problems in medicine."

"Our curriculum," the statement goes on, "has a two-

Student labs embodied a new approach to teaching and the principal means by which the tenet of educating scientifically trained M.D.s was realized.

fold purpose: to develop in all students the capacity for leadership in the clinical practice of scientific medicine, and to provide opportunities for as many students as possible to prepare themselves for careers in research and teaching the various branches of basic, clinical, and social medicine."

After a decade of retreat, Goldstein adds, a majority of the faculty were willing to say, "yes, that's what this place is all about, we have a unique mission, we are a special kind of school, dedicated to training the intellectual and scientific leaders of tomorrow's medicine."

"Everybody agrees that the five-year plan was great, but we never really gave it much of a chance," says Joshua Lederberg, now president of Rockefeller University. "There's no reason in the world for Stanford not to come back to what was originally a very sound idea."

This is in fact what is happening. In June 1984, the school graduated its smallest class in 10 years. While medical school classes have remained constant, explained registrar Charlotte Crucean, a larger number of medical students have opted to stay an additional year to pursue research or take a year off during their studies to gain practical clinical experiences.

The wheel of circumstance has turned full circle.

MEDICAL CENTER
AYEAR AT A TIME

Looking back at two-and-a-half decades of progress, which included 10 turbulent years of campus anti-war activism, events tend to blur in time; significant developments fade from memory—and was it in '68 or '71 that students flew the Mickey Mouse flag outside the school and demonstrators seized the hospital? For the record, these were some highlights and low points:

THE FIFTIES

In the Beginning: Stanford president J. Wallace Sterling was principal actor in the effort to relocate the medical school from San Francisco to the campus, which began in July, 1953. The late Windsor Cutting, who became dean in 1956, believed in that decision, and set the move in motion. But many say Cutting did not fully understand that radical changes were needed to create a world-class institution. He resigned, leaving that goal to the next dean, pediatrician Robert Alway.

First Accelerator: The first six-million-volt linear accelerator for cancer treatment in the Western Hemisphere was installed in Stanford hospital, San Francisco, in 1956. The result of collaboration of radiologist Henry Kaplan and physicists led by Edward Ginzton of Stanford's Microwave Laboratory, the accelerator was first used successfully in 1957. By the time the school had relocated, Kaplan

THE ANATOMY OF EXCELLENCE

As the formal opening of the new medical school drew closer, Dean Robert Alway used a metaphor about the atomic bomb when he described new developments in his bailiwick on campus. And it was not surprising. His directness had achieved results that could be the envy of any dean—it had helped attract new faculty leaders who were clearly in the forefront of their profession.

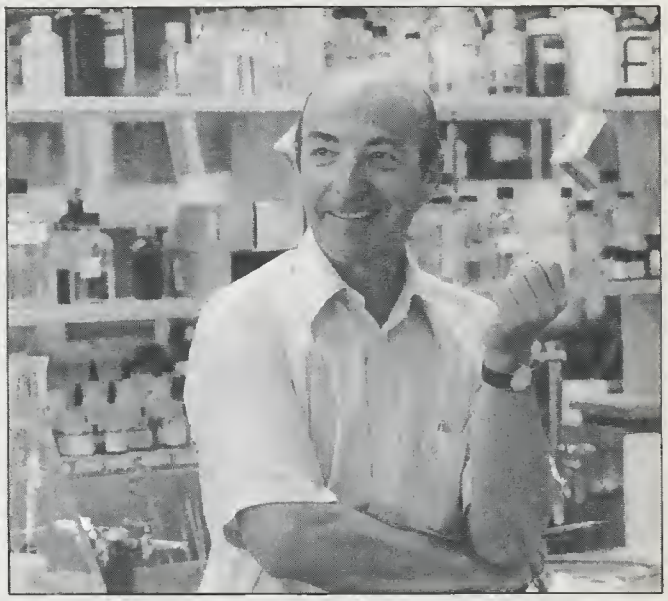
"We wanted people to work with colleagues who would be exciting," Alway explained. And then he turned to the bomb metaphor: "Each person brings the school closer to the critical mass—closer to an explosion you can't control."

How success was achieved is the substance of this report based on interviews with four of the founding academic department chairmen. The question put to them by *Stanford Medicine* was, "What ingredients contributed to excellence in your department?" Their thoughtful and provocative answers are presented below:

'WE WERE DETERMINED TO SHARE OUR LANGUAGES'

by Arthur Kornberg, M.D.

Our department at Washington University consisted of Mel Cohn, a molecularly-oriented immunologist, Dale Kaiser, a virologist, Dave Hogness who understood metabolic regulation in bacteria, and Paul Berg and Bob Lehman, who had started as postdoctoral fellows with me. They had come to St. Louis to be part of the department of microbiology, which had succeeded the classic department of bacteriology and immunology. We were all oriented to teaching biochemistry and the genetic basis of cellular organization and development. Teaching diagnostic bacteriology was no longer as important, I felt, as it had been. I had the conviction then and still do that biochemistry is the keystone of education and the practice of medicine.



The opportunity to come to Stanford to become a bona fide biochemistry department was a major consideration in our move. We were to be a new department unencumbered by a residue of people with ideas and styles that would have to be slowly modified.

I remember the excitement, the anticipation I felt with the kinds of things Avram Goldstein and Henry Kaplan were talking about. Among these was the new curriculum that was interesting, innovative and designed to provide a bright future for the scientific basis of medicine.

In our beginnings at Stanford, the department consisted of the six of us from St. Louis and R. L. (Buzz) Baldwin, a physical biochemist from Wisconsin. We were only half the size of standard biochemistry departments elsewhere. I felt then and still do that an optimal size for a department is about 10 full-time faculty members.

The essence of the cohesiveness that characterizes the

25 YEARS

had developed optimal techniques necessary to begin treating large numbers of patients.

The Opening: Stanford Medical Center was dedicated Sept. 17, 1959. Architect Edward Durell Stone designed the hospital, clinics, medical school and Lane Medical Library to be all under one roof. The 56-acre, $27-million complex had taken four years to plan and build. Two complementary aims—to achieve an expanded and modernized facility for the people of Palo Alto and to replace Stanford School of Medicine in San Francisco—led to a unique partnership between the city and Stanford University. It was the 420-bed Palo Alto-Stanford Hospital Center as an integral part of the Stanford Medical Center, with two separate medical staffs—community and faculty—and shared beds and equipment.

THE SIXTIES

First Open Heart: The first open-heart operation performed at Palo Alto-Stanford Hospital Center in Jan. 8, 1960 was to correct a septal atrial defect. The surgeon: young, unknown assistant professor Norman Shumway.

Bed Crunch: After only six months in operation, the new hospital reported a census boom confirming official fears that 420 beds were not enough. Renovation plans surfaced to put the old Palo Alto Hospital building back in service. Soon after, the hospital board approved a $1.1-million refurbishing plan. Constructed near El Camino Real in 1931 as a city-Stanford enterprise, the old structure was to have been closed.

Accreditation: The hospital center received its first three-year accreditation in August, 1960, from the Joint Commission on Accreditation of Hospitals.

Stanford biochemistry department is sharing most everything. It sounds simple, but it comes down to things that usually divide people. We share money and space, there are no territorial prerogatives. We share in the decisions to select and admit students. We make it easy for them to switch advisors without ill feeling, and we show continual concern for them. We provide ample room for individual expression, but most important we share in the successes that people have occasionally.

Our department is now known as a DNA department. But it wasn't that when we came to Stanford. We were working on a variety of things. We were determined to share our languages. We had noon seminars at least three times a week. We met to review papers, and to hear reports from students and fellows. We met as a group to discuss techniques and materials. In this way we retained a common language. When you understand what others are doing, there is sympathy and respect. Eventually gaps are bridged and often one ends up doing related things.

Administratively, we developed a rotating chairmanship. It's an effective system. When I resigned as chairman, I continued to feel the same sense of responsibility as the others did when I was chairman.

Over the years our faculty expanded modestly and we added space. But the price is some dilution of interactions. People don't bump into each other as often. In a research environment the collision frequency between people is terribly important. It is even more important nowadays when people are away so much and have so many external responsibilities.

As for our accomplishments, we are responsible for some share in the recent revolutionary development of DNA. The explosive advances in genetic engineering, or biotechnology, as some call it euphemistically, have benefited from significant contributions of everyone in our department. Our research was not designed for practical applications. None of us anticipated that our work on DNA would lead to major applications in medicine and industry.

It is reassuring that our research efforts have been recognized. But most important is the satisfaction that we've done good science and there is little else limiting our creativity but ourselves. I tell students and fellows the only tenure that matters in science is the environment to do creative work. The title and related things are trivial. If you have the drive to do something, and you're given modest space and resources, you can do it.

Arthur Kornberg, Nobel laureate in medicine, arrived in the summer of 1959 with five members of his faculty team from Washington University to set up Stanford's biochemistry department. He and his colleagues had isolated an important enzyme which stimulates production of DNA, the complex molecule which determines heredity in all living things. Using this enzyme, Kornberg had produced DNA in the test tube which was exactly like that found in nature. During his tenure as chairman, Kornberg played a pivotal role in the affairs of the medical school while leading research to untwist the double helix of simple bacteria and unlock its replication secrets. The department he established boasts one more Nobel prize won by Paul Berg in 1980; seven of the nine faculty are members of the National Academy of Sciences.

'FOCUS WAS THE KEY'

by Avram Goldstein, M.D.

The secret of a great department is having a theme. Many people disagree with this, but I believe in theme orientation. It's the ingredient that holds people together and stimulates them to great accomplishments. That's what built Arthur Kornberg's department. In the early days everybody in his department worked on some aspect of nucleic acids. Later, some branched out in other areas of biochemistry, but even so it was still heavily oriented in that direction.

First Kidney Transplant: The hospital's first kidney transplant operation was performed in August, 1960 by professor Roy Cohn and associate professor Harry Oberhelman. The kidney came from the patient's twin brother.

Exobiology: Nobel laureate Joshua Lederberg, genetics department chairman, made headlines when the National Aeronautics and Space Administration announced he and associates would design instruments to search for microscopic life on other planets. "Mars was the likeliest target for 'exobiology,' " said Lederberg, who coined the term to describe the emerging field of extraterrestrial science.

Cancer Center: The hospital opened a 15-bed Clinical Radiotherapy Cancer Center, directed by Henry Kaplan and Malcolm Bagshaw. It was one of eight units established by the National Cancer Institute in the U.S. to carry out clinical trials of promising cancer treatments.

Parking Plans: Parking problems came sooner than expected with the influx of patients, students, visitors and volunteers to the new medical center. The center's first parking plan called for separate stickers for professors, students and staff, and an added aggravation: a locked gate on the road leading to the emergency room, which was closed for all but ambulances equipped with a "passkey."

Kennedy Laboratories: With support from the John P. Kennedy, Jr. Memorial Foundation, the medical school announced new programs of education and research in the field of mental retardation, to be housed in the new Clinical Sciences Research Building.

A First: The first West Coast center for children with childhood aphasia was established by the medical school's Division of Speech Pathology and Audiology under the direction of noted expert Jon Eisenson.

Heart Swaps in Dogs: Surgeons Norman Shumway, Richard Lower, Eugene Dong and Edward Hurley in April, 1962 reported they had removed dogs' hearts for up to two hours, then replaced them without apparent

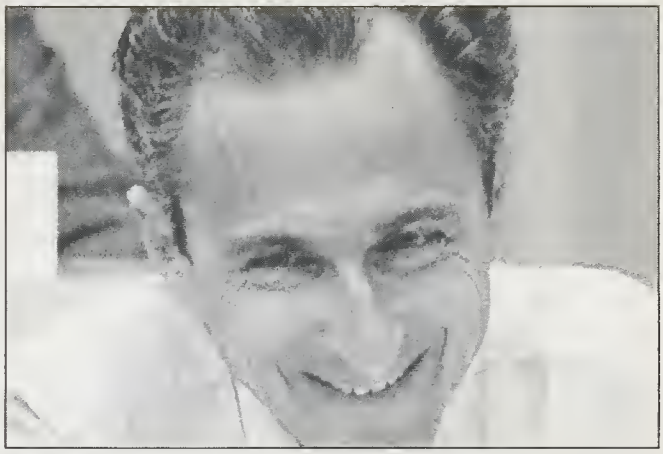
The pharmacology department has been strongly oriented toward molecular approaches. We wanted our department to be in the forefront of the new movement I called molecular pharmacology. We never tried to do anything else, not clinical pharmacology, not physiological or behavioral pharmacology. We chose a single focus, and focus was the key to success.

For example, Bob Schimke's very important early work on gene amplification was done while he was a member of our department. The work of [present chairman] Tag Mansour on the biochemical and molecular pharmacology of parasites has important implications for novel treatments of parasitic diseases throughout the underdeveloped countries of the world. Dora Goldstein's pioneering work on alcohol and cell membranes has exposed what most people now recognize as the mechanism of action of alcohol as a drug.

My own work on the opioid (morphine-like) brain peptides (including dynorphin, which we identified several years ago) was part of the same thematic focus. We pioneered the search for opioid receptors by first demonstrating their existence in brain tissue through a technique later universally adopted. The opioid peptides would be implicated ultimately in natural pain control, acupuncture analgesia, opiate addiction, and numerous aspects of brain function, shedding new light on the pharmacology of morphine.

We established a distinguished though quite small pharmacology department that for years was rated among the top two in the nation. Recently, under Tag Mansour's chairmanship, the emphasis on molecular pharmacology has been strengthened by the addition of five younger faculty members who are practitioners of the exciting new recombinant DNA technology.

Avram Goldstein is considered one of the architects of the new Stanford medical school during the move in 1959. He headed the department of pharmacology from 1955 to 1971 when he resigned his post to devote his energies to research and teaching. He founded the Addiction Research Foundation in 1974, a nonprofit organization whose aim is to develop basic information about the chemical basis of drug addictions. He is founder of the journal Molecular Pharmacology, *a member of the National Academy of Sciences, and a recipient of numerous honors including the Franklin Medal and the highest honor in American pharmacology, the Sollmann Award.*



'WE WERE NOT LOCKED INTO ESTABLISHED PATTERNS'

by David Hamburg, M.D.

My chief attraction to Stanford was the people, what Henry Kaplan and Bob Alway used to call "intellectual playmates." These were strong academic chairmen with a sense of the importance of innovation. When I was interviewed for the psychiatry chairmanship they conveyed to me that any reasonable new idea would get a fair hearing, that the school was not locked into rigid patterns.

This was important because psychiatry in those days was in dire need of building a strong scientific base. To do so in a setting like Stanford required dynamic interplay between basic and clinical disciplines, including the behavioral and biological sciences on campus.

After I had been on the job for awhile, Bob Alway used to kid me, saying, "When are you going to appoint a psychiatrist?" That was because in my early recruitment efforts I went after basic scientists, and it was almost unprecedented in psychiatry to build a department that way. It seemed to me though that we had to think about strong, innovative, cutting-edge-type of research and clinical programs. An example on the social side is what the department has achieved with Irvin Yalom and Rudolf Moos, and on the basic research side with Jack Barchas.

25 YEARS

harm. This, they said, was the first step to make heart transplantation feasible in humans.

Chain Reaction: The hospital opened two research centers for human disease studies under grants by the National Institutes of Health to the medical school, including the first NIH center ever to study premature infants.

Accelerator Industry: New gleaming versions of the medical school's once experimental linear accelerator for cancer treatment went into use at UCLA Medical Center and Palo Alto-Stanford Hospital Center in November, 1962, marking the first export of Stanford-developed therapeutic technology.

Lasers for Retinas: Ophthalmologists Milton Flocks and Christian Zweng, clinical faculty members, demonstrated the use of lasers to weld detached retinas in animals before a group of eye specialists. The laser was developed by an NIH grant to Palo Alto Medical Research Foundation. Soon after, they reported successful use of the laser to treat retinal detachment in patients.

Mission Accomplished: Medical school dean Robert Alway resigned, noting the accomplishment from 1957 through 1964 of objectives of the school's relocation and executive reorganization. Sidney Raffel, microbiology chairman, succeeded Alway as acting dean.

Blue Babies: Norman Shumway told an American Heart Association meeting that complete cure of "blue baby" heart defects could be accomplished with negligible risk. Of 43 consecutive operations performed at Stanford, mortality was zero and patients subsequently had normal functioning hearts. Many surgeons were still reluctant to perform the operation even though he said it could be done safely.

Yalom was interested in inpatient group therapy within different contexts, including psychiatric hospitals undergoing change. Moos has been concerned with treatment environments and the way people cope with stress and life crises. Barchas and others have been researching exclusively the basic causes of psychiatric illness at the neurochemical level. The strategy was to get clinicians immersed in contact with basic scientists. This was extremely beneficial. Our people became bridges to other university departments, and the intellectual stimulation was tremendous.

Joshua Lederberg and I shared a view that professional schools in the university ought to be part of undergraduate education. We organized a course on "Man as an Organism," the forerunner of the human biology program which symbolized the openness to innovation and broadening of outlook across disciplines that I had found so attractive about Stanford.

Our faculty was encouraged to take posts in clinical services such as medicine, pediatrics and surgery. I thought it was important for us to be exposed to psychiatric aspects of clinical problems presented in these settings. Our primate research became a very intimate ongoing interplay between laboratory and field studies on the relationship of hormones to behavior.

Work by Betty Hamburg put the study of early adolescence on the map. In those days people did not fully appreciate its importance. We made some lasting contributions in increasing scientific awareness in early adolescence as a major phase of the lifespan with clinical implications.

David Hamburg became chairman of the psychiatry department at Stanford in 1961. He came from the National Institute of Mental Health in Bethesda, where he was chief of the adult psychiatry branch. An expert on the effects of psychological stress on human behavior, Hamburg resigned as chairman in 1972 to return to research and teaching. Later he became president of the Institute of Medicine of the National Academy of Sciences and held posts at the Kennedy Policy Center at Harvard before assuming his present position as president of the Carnegie Corporation in New York.

'I INSISTED ON LABORATORY SPACE FROM THE START'

by Henry S. Kaplan, M.D.

When I became department chairman in 1948 not a single department of radiology in the world did scientific research. The only thing being called research for diagnostic radiologists was to sit on their butts in front of a viewing box and look at films and perhaps collect one or two cases of some rare malformation. That was the only notion of research.

I felt it was very important for therapeutic radiology to have an experimental as well as a clinical research base. I insisted on laboratory space from the start. I felt intuitively that it was no good having a department chairman make big speeches about how important research is and himself doing no research whatever. I felt, on the contrary, that in radiology, which was then so backward with respect to research, that the only way it would work was for me was to see just as many films, just as many patients as anybody else, and to be chairman on top of that and do research. That would shame my faculty into feeling that they too could and should do research. Obviously, not everyone I selected turned out to be a red-hot research man. But in the course of time I weeded out most of the ones who were not productive in both areas—the laboratory and the bedside.

If my endeavors had a focus on some central theme, you might say I created the idea of doing laboratory research in an academic department of radiology, and I insisted on doing it myself partly because I was interested and because it closed off an escape hatch for other faculty members who could have found excuses for not doing research.

But there is another point to be made on the issue of what makes a good or great clinical department. I frequently stressed to our faculty that no matter what else was going on, it was a given that the quality of patient care in the department had to be absolutely first class. We could not undercut the quality of patient care just to find more time for our research.

These remarks by the late Henry Kaplan are based on interviews he gave to Stanford Medicine *prior to his death from lung cancer in February 1984. More on Dr. Kaplan appears in the "Farewell" section.*

Harvard Man at the Helm: Robert Glaser of Harvard Medical School was appointed vice president for medical affairs and medical school dean.

Man's Best Friend: A dog, "Ralphie," lived with a transplanted heart from another dog for more than a year, paving way for Stanford's first human clinical trials.

Aid for Hemophiliacs: Stanford researcher Judith Pool developed a new technique for extracting antihemophilic globulin (AHG), the blood fraction needed to prevent bleeding in hemophiliacs. The method could be carried out in any blood bank or hospital, and once the fraction was removed, the rest of the blood was available for regular transfusions. The fraction was 15 times as concentrated as in normal blood plasma, and it meant hemophiliacs no longer needed treatments with whole plasma liquid that overloaded circulation.

Hoover Opened: After major renovation, Palo Alto Hospital, renamed Hoover Pavilion, formally reopened May 15, 1965.

Pacesetting Ear Surgery: The first extensive electrical stimulations of the auditory nerve in man to treat deafness were reported by otolaryngologist Blair Simmons and associates in June, 1965. The studies suggested that speech communication via direct nerve stimulation was possible, paving the way for development of implantable artificial hearing devices.

Preemies Treatment: Pediatricians Philip Sunshine, Irwin Schafer and Marshall Klaus and anesthesiologist Vernon Thomas reported successful application of respiratory therapy to infants with hyaline membrane disease, a respiratory distress syndrome that affects more than 25,000 newborns in the U.S. The therapy, common in adults with breathing difficulties, rarely had been applied to infants.

PACESETTERS

Stanford medical school relocated from San Francisco to the campus at a time when a national commitment had been made to accelerate biomedical research and a creative atmosphere was leading to a scientific revolution which altered the character of medicine. Looking back, American medicine changed more from the '60s through the '80s than in any preceding period.

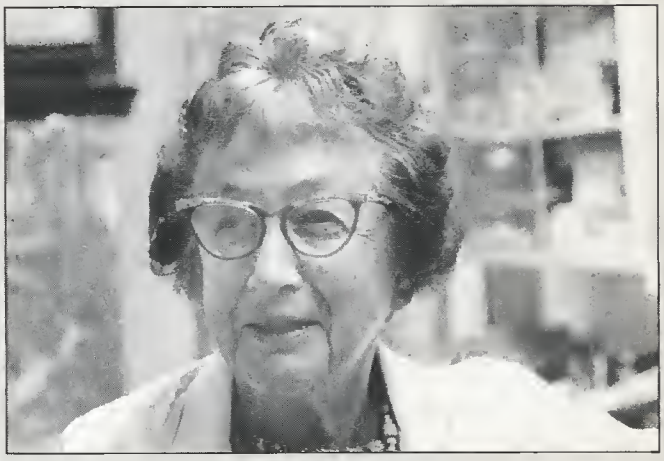
Fundamental discoveries in biology, technological developments in new diagnostic and therapeutic tools and changes in treatments sparked the changes. The modern hospital is the most conspicuous result, transformed from a place where patients went to die into a place where they can enter with confidence that they will be helped. The elaborate division of doctors into specialties and subspecialties is a result of the accumulation of knowledge and capability to help the sick in the most diverse ways.

For skeptics who doubt this progress, consider this evidence. In 1979, infant mortality in the United States was 13.0 deaths per thousand live births, precisely one-half the 26.0 deaths per thousand live births in 1960. And whereas in 1960, life expectancy at birth was 66.6 years for American males and 73.1 years for females, for 1979 and 1980, those same expectancies have been raised to 70 and 78 years respectively.

Unlike previous revolutions, the biomedical revolution was an interacting one, with fundamental discoveries of the laboratory applied rapidly for the benefit of patients. Following is a gallery of just a few of the Stanford faculty whose contributions both at the bedside and laboratory are widely recognized as part of this revolution.

ROSE PAYNE, Ph.D.

Payne leaped to fame in the early '50s when she confirmed earlier scientists' observations that white blood cells of the body produce antibodies against invading foreign substances. Using new techniques, she found that patients who developed antibodies had received blood transfusions to which their white blood cells had



Payne

reacted by forming protective shields against the foreign blood. Fever and chills followed. Others confirmed her conclusions, and a way was found to prevent this reaction by removing the white cells from blood prior to transfusion. The discovery brought a new phrase into medicine—"human leukocyte antigens," or HLA. These antigens are protein molecules whose structures are specified by genes deep in the cell nucleus. The antigens recognize foreign substances, including transplanted organs, as they enter the body and provoke a defensive reponse against them. Payne's laboratory played a key role in applying tissue matching techniques to determine the genetic compatibility of donor and recipient, thus contributing to success of organ transplants.

NORMAN E. SHUMWAY, M.D.

In animal experiments that preceded the historic transplantation of the first human heart in South Africa by 10 years, Shumway and his colleague Richard Lower (now at the Medical College of Virginia) had developed

25 YEARS

Triple Heart Valves: Multiple heart valve replacement, a rare procedure in the early '60s, could be accomplished safely in one single operation, Shumway reported after his team did 28 at Stanford with only one death.

First Addition: New clinical sciences research building dedicated May 26, 1966.

Inhalation Therapists: The first academically trained inhalation therapists in the U.S. graduated in 1966 from the hospital center and Foothill College's program.

Coronary Care: Thanks to community physicians, the hospital center's coronary care unit opened Sept. 26, 1966. The four-bed CCU was developed by cardiologist Alfred P. Spivack and Stanford Kroopf, chairman of Palo Alto medical staff's coronary care committee. Spivack was CCU's first director.

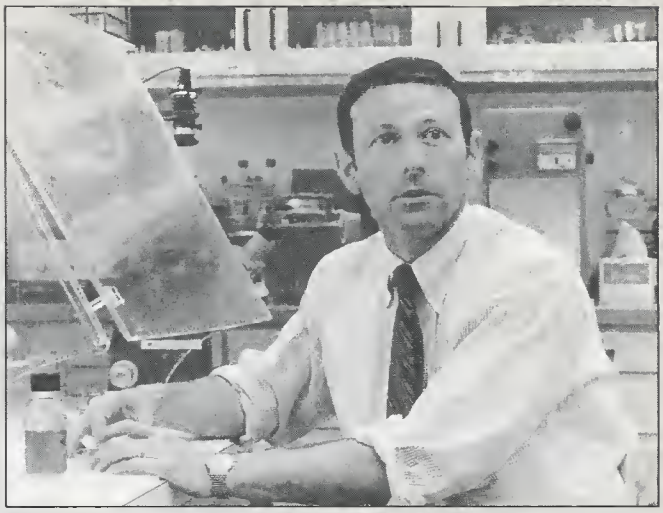
Computer Marvels: The medical schools' first computing facility, ACME (Advanced Computer for Medical Research), was constructed under an NIH grant.

Best Hospital: Palo Alto-Stanford Hospital Center was ranked a top-10 hospital in the U.S. by a panel of experts in a 1967 national poll.

Divorce: Citing "unwieldy" organizational arrangements and the hospital's unresponsiveness to teaching and research needs of the medical school, Dean Robert Glaser and university president Wallace Sterling proposed negotiations between Palo Alto city council and Stanford to acquire the city's share of the hospital.

New Hospital Plans: The medical school received trustee approval and a $500,000 grant from the Commonwealth Fund of New York to plan a new basic science building for the departments of anatomy, physiology and

Shumway



Berg

the surgical techniques as well as regimens to control rejection and had reported the first successful heart transplant in a dog. By the time human heart transplants had begun, Shumway's group had the experience and track record to enter the field with confidence. When others abandoned heart transplants, discouraged by dismal mortality rates, Shumway persevered. For a while his was the only group in the world transplanting hearts. Shumway's group also succeeded in transplanting combined hearts and lungs. Encouraged by his track record, surgeons elsewhere have resumed heart transplants. Equally significant are the spinoffs of his program in other areas of medicine, to say nothing of Shumway's influence in having trained some of the best cardiovascular surgeons in the world.

PAUL BERG, Ph.D.

A 1980 Nobel Prize recipient in chemistry for contributions that made DNA recombination a reality, Berg also shares the distinction of shaping a responsible policy for dealing with its possible risks. Over the years, he has developed novel techniques allowing researchers to examine the structure and control of genes of higher organisms in a way previously unimagined. The Swedish Royal Academy honored him for "his fundamental studies of the biochemistry of nucleic acids, with particular regard to recombinant DNA." In the past decade recombinant DNA techniques have become increasingly sophisticated, with Berg and others playing a major role. His goal, as he states it, "is to understand how gene action is regulated during development and how these processes and reactions go awry in disease. Perhaps then our attempts at diagnosis, prevention and cure of disease can be made more rational and effective."

HUGH McDEVITT, M.D.

It has long been known to medical science that some people are vulnerable to diseases that run in families. But even though many widespread disorders—such as rheumatoid arthritis and multiple sclerosis—have been linked to heredity, no means has existed to spot individual susceptibility to them and to start treatment before they attack their victims. In the mid '60s McDevitt and his group discovered that immune response genes controlling the body's response to infection are clustered together on one chromosome in the mouse and are closely linked to genes responsible for destroying tissue grafts. Because these genes direct production of HLA, the protein molecules involved in the body's defense system, it was clear that McDevitt had found a unique pointer of human vulnerability to certain diseases. By the early '70s, groups in Los Angeles and London had

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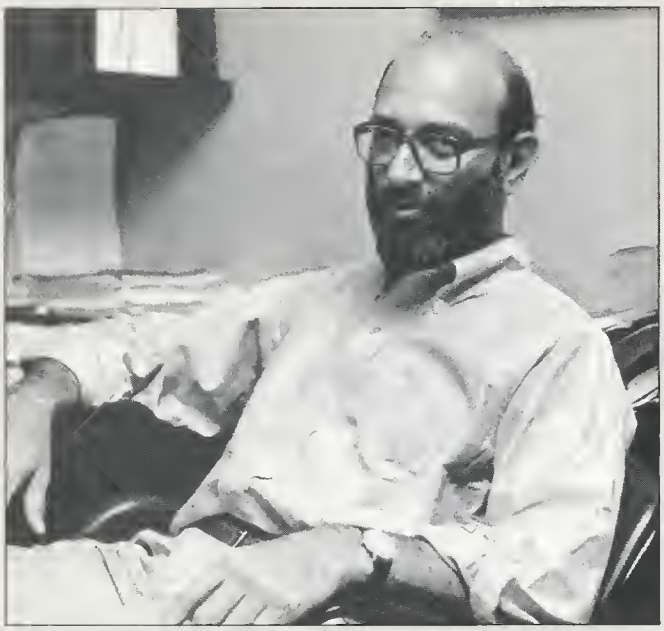
medical microbiology, and a new hospital and ambulatory care center. Beltrand Goldberg Associates of Chicago were appointed consultants for the projects and development of a center-wide master plan.

Babies in Distress: An electronic monitoring system to aid infants suffering from respiratory disorders was developed by Stanford pediatricians and engineers from Beckman Medical Instruments.

In the Test Tube: Nobel laureate Arthur Kornberg and associates reported the test-tube synthesis of infectious viral DNA displaying full biological activity. That such a feat was possible had been demonstrated in all DNA work done since 1960, and neither Kornberg nor others regarded it as a "breakthrough." Nevertheless, it received much public attention because it was the first time anyone had taken 5,300 nucleotide building blocks off the shelf and used an enzyme to string them together in precise sequence to produce an infectious DNA molecule. The development was sensationalized when President Lyndon B. Johnson, at a dinner speech at the Smithsonian Institution in Washington, mentioned Kornberg's work and described it as "creation of life in the test tube."

Another First: The first heart transplant in an adult patient in the U.S. was performed at the hospital center Jan. 6, 1969 by Norman Shumway, Edward Stinson, Eugene Dong and colleagues. The patient, 54-year-old Mike Kasperak, died 15 days later from what Shumway termed "a galaxy of complications involving the lungs, liver, and kidneys." This



Cohen

established the first link between such genes and a form of arthritis in man. By 1980 links had been established in other rheumatic conditions, as well as neurological, endocrine, gastrointestinal and skin disorders, pointing to a new predictive power of medicine with early treatment or prevention of some diseases becoming possible.

STANLEY COHEN, M.D.

While many contributed to recombinant DNA research, it was molecular geneticist Cohen, Annie Chang at Stanford and Herbert Boyer at the University of California, San Francisco that made it practical. The heart of recombinant DNA technology is not just gene splicing but also gene cloning. It involves techniques to get genes into cells, ensures that the genes are expressed, and then selects for the cells that are expressing those genes. Cohen and his colleagues in the early 1970s developed a plasmid, a small piece of extra-chromosomal DNA, and used it successfully to carry foreign genes into bacterial cells. The ability to clone and manipulate DNA molecules introduced into bacteria and cells of higher organisms has enabled the study of gene organization at a new level. It has also sparked the development of a biotechnology industry and rapid successes as production by "bacterial factories" of biologically active hormones such as insulin, somatostatin, human growth factor, and anti-virals. Cohen's contributions have been recognized by the prestigious 1981 Wolf Prize, the American Chemical Society's Marvin Johnson Award, and the 1980 Albert Lasker Medical Research Award.

NORMAN KRETCHMER, M.D.

Kretchmer led Stanford's pediatrics program for 10 years, broadening its scope to include the molecular, physiologic and behavioral aspects of human growth and development. Two years after he arrived from Cornell, he obtained the first award from the National Institutes of Health to develop a clinical research center for premature infants. This was the precursor of today's expanded thrust in neonatology as well as other programs developed by Irving Schulman, present chairman. Kretchmer established research and training in the field of developmental biochemistry, an effort that united research and clinical work toward a biochemical understanding of birth defects, metabolic diseases and mental retardation. Internationally, he was an influential voice on issues of malnutrition and risks to human reproduction of pesticide exposure. In 1969, when he left to head the National Institute of Child Health and Human Development in Bethesda, Kretchmer had just completed a term on the committee responsible for development of Stanford's undergraduate program in human biology. He is presently on the faculty of the University of California at San Francisco.

JOHN HANBERY, M.D.

Hanbery, affectionately called Jake by his students and Stanford associates, has headed neurosurgery for 22 years. If you ask what they think of him, these words come up frequently. "The best, most reliable, most respected neurosurgeon in the country. He's the prototype of dignity, total dedication, completely immersed in exemplary habits of patient care—a truly great surgeon." If anything comes before his students, it's patients. Hanbery has fought aggressively for research

25 YEARS

and two subsequent cases confirmed Shumway's theory that heart transplants would offer little to patients whose death is imminent from effects of chronic heart failure on other organs. With revised selection criteria, Shumway's third and fourth recipients did remarkably well, converting his theory into fact.

Hospital Ownership: Stanford University became the sole owner of the hospital under an agreement approved July 1, 1968 by Palo Alto's city council. Stanford paid $1 million cash to the city, assumed $3.5 million worth of hospital construction bond payments over 20 years and guaranteed specified community hospital services until 2008. Private physicians on the medical staff retained affiliation, plus priority to admit patients to 370 of the hospital's 663 beds.

Nuclear Medicine: A technique, radioisotopic angiocardiography, was developed by Joseph Kriss and associates in the nuclear medicine division and genetics instrumentation laboratory to expedite heart disease diagnosis. It enabled the recording and display of movement of radioactive material flowing through hearts and lungs.

Crucial Departure: Glaser resigned to join the Commonwealth Fund of New York. In four years, Glaser had dealt with principal issues, appointed key faculty, created a master plan, launched a minority student program, and concluded the hospital purchase. His departure, coupled with faculty apprehensions and preoccupation of university administrators with a growing campus anti-war activism, had negative effects. New hospital and

spearheaded by others in his division, but he has remained primarily a clinical doctor and a great teacher of future neurosurgeons.

DORA GOLDSTEIN, M.D.

Since 1966, Goldstein has worked almost exclusively on the physiological effects of alcohol. She is credited for key discoveries on how alcohol affects the human body. She developed techniques enabling her to create an animal model of alcohol and drug dependency which became the basis for most of the current theories on the role of alcohol as a drug. Goldstein has also studied the molecular changes that occur in the cell membranes of mice subjected to ethanol treatment, suggesting that the membranes themselves adapt to the drug, a novel form of drug tolerance.

SAUL ROSENBERG, M.D.

Oncologist Rosenberg has received international acclaim for his research on Hodgkin's disease. With pioneer Henry Kaplan, he has made dramatic advances in the diagnosis and treatment of the disease. These have led to better than 80 percent survival at five years for all stages, with 75 percent of the patients being permanently cured. Rosenberg spearheaded the development of oncology, helped establish training programs for physicians, and made it a successful, respectable field in internal medicine.

ROY COHN, M.D.

Like many of his famous predecessors in the surgical department, Cohn bears the mark of the Stanford man engraved in his character—a constant striving for the worthwhile, a love of the strenuous life in work and in play and the ability to smile at his own foibles. Now formally retired but still involved, Cohn characterizes the best that was and is in the medical school. As a surgeon and researcher in the early '60s, Cohn and the late Samuel Kountz concentrated on kidney transplantation. His papers on the relationship of blood flow in kidney and homograft reaction are considered landmark contributions. From 1963 through 1966 Stanford was a leader in the field of kidney transplantation under

Gotdstein

Cohn's leadership. In spite of it, school leaders of that time were dubious about the future of organ transplantation and were reluctant to invest in people and resources to continue it. They were wrong, and current plans call for the resumption of kidney transplants at Stanford in the near future.

EUGENE FARBER, M.D.

It can be said that at Stanford the study of the skin assumed its rightful place under Farber's leadership. Determined to bring the neglected dermatology field up to date, Farber gathered clinicians and basic scientists to work together on the belief that abnormal skin conditions could not be helped without basic knowledge. The studies clarified the relationship of psoriasis to arthritis and demonstrated it to be an inherited disease of the entire skin. He developed an epidemiological map of psoriasis through study of patient records from abroad, stimulating worldwide interest in psoriasis research. In the '50s he and the late Henry Kaplan co-developed an

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science building plans were tabled indefinitely.

THE SEVENTIES

Violence: Dismissal of a black hospital housekeeper in April, 1971 led to a 30-hour sit-in by some employees and an outside group waving North Vietnamese flags. They alleged the employee's firing was "racially inspired" and demanded his rehiring. The hospital said it would accelerate its "affirmative action" programs but refused to rehire the employee, who had been fired for cause. When police were called, a riot ensued, causing more than $100,000 damage to the hospital, arrest of 23 demonstrators, and injuries to more than 20 people.

Genes-Disease Link: Immunologist Hugh McDevitt discovered a new class of regulatory genes that control the body's immune responses to foreign substances like viruses and bacteria. The finding suggested that people may have predictable genetic susceptibility to certain diseases.

Argon Laser: Stanford, Palo Alto Medical Research Foundation and SRI International reported development of an argon gas laser to treat retinal disease. The argon laser's blue-green light was better suited for treatment because it was absorbed by red blood pigment, explained ophthalmologist Christian Zweng.

Sonar for Hearts: Sonic impulses bounced against hearts' interior walls were found to provide useful information about heartbeat and blood circulation. The new use of sonar or ultrasound was adapted for medical diagnostic work by Stanford cardiology chief Donald Harrison and NASA-Ames Research Center scientists.

Farber

effective treatment for mycosis fungoides, a skin lymphoma. Since then, Stanford, through use of electron beam therapy, has treated the largest number of patients with this form of cancer. Farber's efforts led also to novel treatments for psoriasis, making Stanford a leading center for the study and treatment of skin disease.

WILLIAM DEMENT, M.D.

In the early '50s, with colleagues at the University of Chicago, Dement discovered that sleeping human volunteers showed episodic flurries of rapid, jerky, synchronous eye movements. Studies showed that the eye movements occurred only in association with a particular stage of brain wave activity, which appeared and reappeared with regularity every 90 minutes throughout the night. To distinguish these periods from the remainder of sleep, the term "rapid eye movement" (REM) sleep was coined. At Stanford since 1963, Dement became one of the world's leading authorities on sleep disorders. His research has contributed to understanding of narcolepsy, sleep apnea, sudden infant death syndrome, the effects of sleeping pills and insomnia. Through the Sleep Disorders Clinic and Laboratory, which Dement has directed since 1970, many of his findings have been applied for the benefit of patients with severe sleep problems.

THOMAS STAMEY, M.D.

Quiet, friendly and understated, Stamey is considered a leader in the field of urology. His research, conducted in the urology division which he has directed since 1962, led to a drastic change in the understanding and treatment of recurrent urinary tract infections, a stubborn problem for patients and their doctors. His work focused on differences between infections confined to the bladder and those involving one or both kidneys as well. Stamey's studies led to effective antibiotic treatments and revealed the existence of a natural antibacterial factor in prostatic fluid. This factor is now believed to keep male urinary tract infections to a minimum—they are only about one-tenth as frequent in males as in females. "Although we're known at least in the urologic world for our investigative efforts, all of our research has essentially been set up around patients," he says. "I think we ought to investigate things that have some chance of touching on the lives of people."

JOSHUA LEDERBERG, Ph.D.

From 1959 to 1978, when he left the medical school to become president of Rockefeller University, Nobel laureate geneticist Lederberg was Stanford's "man for all seasons." From the intricacies of the cell to the search for life on other planets, Lederberg's ideas have had enormous impact on the university, catalyzing the interests of faculty in many fields. He directed the Kennedy Laboratories for Molecular Medicine, whose research in mental retardation evolved into the department of neurobiology. He became involved in the development of the human biology program for undergraduates. In the early '60s, with physicists and engineers, he experimented with ways to detect microorganisms on Mars and developed mass spectrometry instruments which could detect complex organic molecules. It was such equipment that went aboard the Viking spacecraft and reached Mars in 1976. During his involvement with the space program, Lederberg became schooled in organic chemistry and the use of computers for data analysis

25 YEARS

Bissinger Center: Radiation Therapy dedicated a new $1-million center named in honor of San Francisco businessman Paul A. Bissinger who spearheaded the fund drive through a group he founded, Friends of Radiology.

New VP and Dean: Clayton Rich from the University of Washington was appointed vice president for medical affairs and medical school dean.

Cell Sorter: Using space-age technology, genetics professor Leonard Herzenberg and colleagues developed a revolutionary new tool for studying basic cell biology. Called the fluorescence-activated cell sorter (FACS), it enables scientists to identify and isolate closely related types of animal cells at rates of up to 5,000 cells per second. FACS machines are aiding basic research in laboratories throughout the world.

Casualty: Stanford's School of Nursing was closed.

Nerve Growth Factor: A hormone called NGF for short was isolated and crystallized by neurobiologist Eric Shooter and colleagues. Discovered by Italian scientist Rita Levi-Montalcini in 1950, NGF is necessary for development of nerve cells.

Kidney Dialysis: A new hospital kidney dialysis center opened to serve local and regional needs of patients.

Interferon: First successful trial by Stanford's Thomas Merigan and British scientists prevented common cold infections in human volunteers. This stimulated further research based on the belief that interferon, a natural protein produced by the body, could have future usefulness as an antiviral remedy if it could be mass produced.

Heart Disease Prevention: Supported by a $4-million NIH grant, Stanford launched a new program to combat heart disease through education, including use of mass

and problem solving activities. This suggested "intelligent" computer programs, which employed a chain of reasoning analogous to human deduction and led him to join forces with Stanford computer scientists to explore this application. Lederberg's efforts led to the installation of SUMEX-AIM (Stanford University Medical Experimental Computer/Artificial Intelligence in Medicine) to provide the hardware for projects conducted by scientists nationwide.

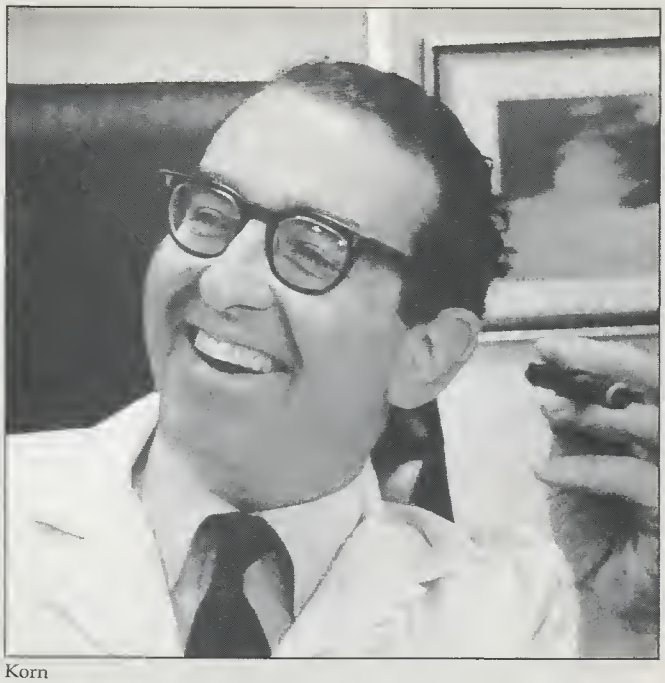
Lederberg's influence has extended beyond the confines of the campus. He once wrote a widely syndicated column for the *Washington Post*. He participated in negotiations of the biological weapons disarmament treaty and fought for increasing public involvement in science policy. An article has summed up Lederberg "as the successful juxtaposition of scientist and humanist."

HALSTED HOLMAN, M.D.

Holman, chairman of medicine from 1960 to 1971, established a department with a strong biomedical research base. This, he explains, was in keeping with the then widely accepted notion that medical problems could be solved through research alone. Today he questions this idea not as inappropriate but as insufficient to deal with the problems of patients. "Biomedical research employs a reductionist method which studies phenomena in total isolation from surrounding intervening factors," he says. "Yet the sick human being consists of interacting variables which determine direction, outcome and response of his illness to therapy."

Nevertheless, the department under Holman's leadership did achieve important objectives. They included the development of a patient base in Palo Alto, which did not exist previously. Most significantly, they involved Holman's choice of young faculty who became leaders in research—Hugh McDevitt in immunology, Thomas Merigan in infectious disease, Stanley Cohen in clinical pharmacology and molecular genetics, Stanley Schrier in hematology and Donald Harrison in cardiology.

As for the future, Holman, who now directs the Stanford Arthritis Center, thinks the department can and must develop new strengths. "This should not be undisciplined clinical development at the expense of science, but as a complement to it," he says, adding that the stage for achieving that was set during Kenneth Melmon's chairmanship.



Korn

DAVID KORN, M.D.

Under Korn the department of pathology has achieved distinction for its double-pronged approach: the study of disease and the processes involved at the basic level. Korn, who came to Stanford from the National Institutes of Health in 1968, recruited top talent—Ronald Dorfman, Richard Kempson and Howard Sussman in clinical services and laboratories. He appointed a host of basic scientists: Irving Weissman, Carl Grumet, Edgar Engleman, David Clayton, Errol Friedberg and others to work in hot areas of research with strong cellular and molecular focuses. Korn's own research is on enzymes that synthesize DNA and are presumably involved in DNA replication in higher organisms. As biology became the cornerstone of medicine, Korn says, it was essential for pathology to remain responsible to the patient for services that depend on the pathologist's expertise.

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media, in three California communities. The program, a joint effort of the departments of medicine and communication and directed by John Farquhar and Henry Breitrose, was designed to stress changes in high risk habits. Closely tied in are the Lipid Research Clinic and Specialized Center for Research, which conduct studies on metabolic factors—fats, cholesterol and other compounds—that are risk factors in heart disease.

Anesthetic Pollution: Female nurses and anesthetists faced possible health risks because hospital operating rooms were contaminated by trace amounts of anesthetics, found Ellis Cohen, Weldon Bellville and Byron Brown. They showed anesthetic pollution to be associated with a high rate of spontaneous miscarriages. They did not prove a cause-effect relationship, but anesthesiologist Charles Whitcher developed "a scavenging system" to vent gases out of operating rooms. Federal safety guidelines requiring such systems were adopted for hospitals nationwide.

Arthritis Center: Stanford's Arthritis Center opened. Directed by Halsted Holman, it is part of a national network of 18 centers established by Congress to combat arthritis through research and emphasis on community-based educational programs. Closely linked is the American Rheumatism Association Medical Information System (ARAMIS), also federally funded and based at Stanford. Directed by James Fries, ARAMIS is the most comprehensive national data bank system on arthritis and related diseases ever devised.

Vaccines: Human cell cultures developed and stored in the laboratory of microbiology professor Leonard Hayflick were licensed by NIH's Division of Biologics Standards to be used as a growth medium to make vaccines. Use of the human cells meant cheaper vaccines, unmatched safety, and an end to the slaughter of monkeys whose cells had been widely used but could be contaminated by viruses.

MOMENTS

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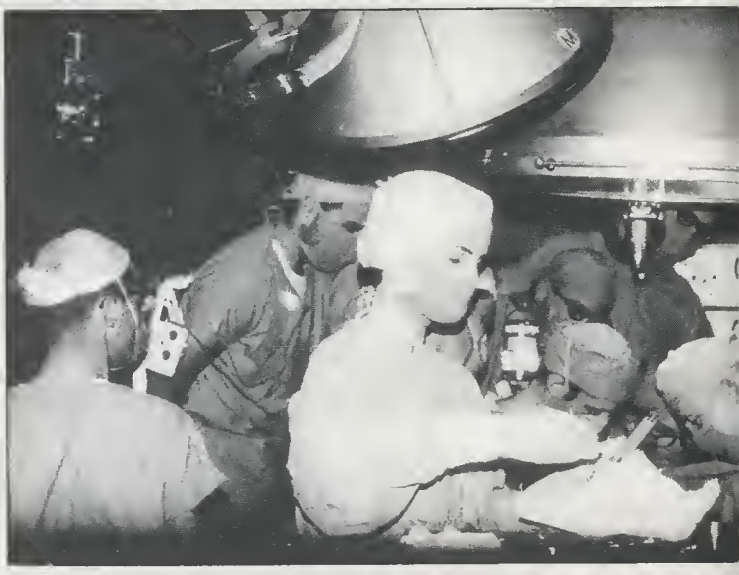

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1. Remember when the medical center's dedication got rained out, or rather, in? A publicity genius got a couple of duck decoys to float in a puddle for news pictures of the rows of sodden chairs. Quipped *San Francisco Chronicle*'s Herb Caen, "Can you think of a better place to have your hunting accident?"
2. Protest rallies against the Vietnam War were a familiar scene on the premises of the medical center in the '60s.
3. The demolition of the old school on Clay and Webster streets in San Francisco in 1973 was observed by the revival of the popular revue "The Clay Street Blues," performed by professors and former students.
4. Nobel prize winning biochemist Arthur Kornberg (right) and colleague Mehran Goulian share a moment of triumph at a 1967 press conference to discuss synthesis of the first biologically active DNA.
5. Volunteer and patient: reassuring moment.

25 YEARS

Crib-o-gram: An automated monitor that screens newborns for deafness was tested successfully in more than 6,000 babies at Stanford hospital nurseries over a two-year period. Early detected hearing loss could prevent retarded speech and language development. Invented by otolaryngologist Blair Simmons, the crib-o-gram is now used in many hospitals.

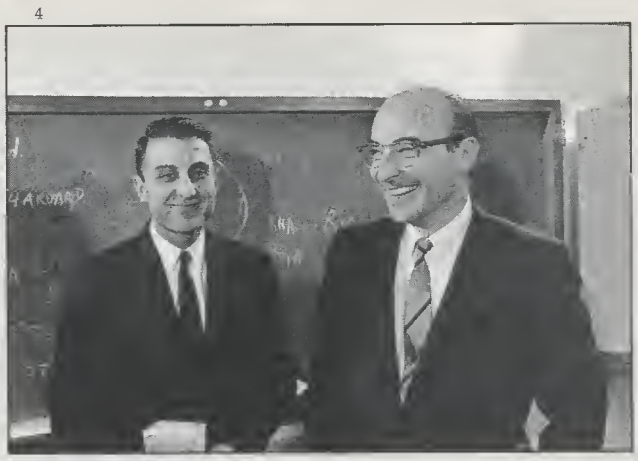
New Concept: The first hospital-based Psoriasis Day Care Center, directed and staffed by the department of dermatology, was opened at Hoover Pavillion.

Centralization: Vice president and dean Clayton Rich announced consolidation of fiscal and some administrative functions of the hospital, school and clinics under a single Office of Medical Center Finance. Operational divisions between the hospital and the rest of the center set during joint ownership no longer made sense, he said.

Genetic Engineering: Techniques developed by genetics professor Stanley Cohen and Annie Chang at Stanford and Herbert Boyer at the University of California, San Francisco, demonstrated a practical method for transplanting genes from one species to another. Their landmark contribution enabled studies of gene organization at a new level, and sparked development of the biotechnology industry.

Opioid Receptor: A "narcotic receptor" governing drug addiction was isolated by Avram Goldstein and colleagues in the pharmacology department and Addiction Research Foundation.

Cancer Biology: The $1.2-million Louis B. Mayer Cancer Biology Building to house research in basic immunology and virology was dedicated.



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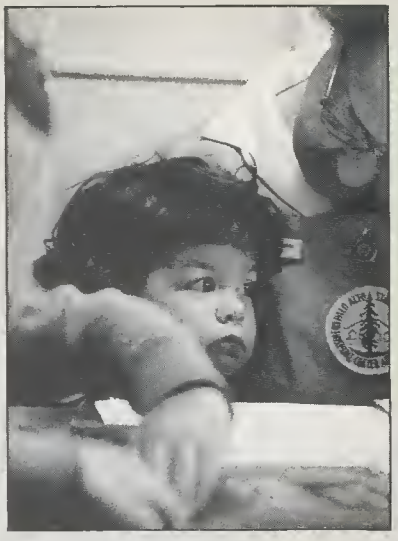

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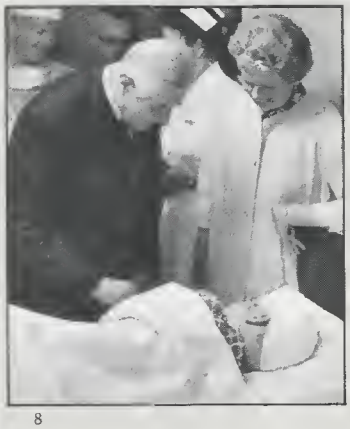

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6. All smiles after lengthy negotiations, vice president and medical school dean Robert J. Glaser, Stanford president J. Wallace Sterling and Palo Alto mayor Frances Dias, sign the agreement transferring ownership of the city's hospital wing to Stanford.
7. The historic first adult heart transplant to be performed in the U.S., in Jan. 1968, was captured in the last frame of a surgical resident's film. Drs. Norman Shumway, Edward Stinson and Denver Nelson, and nurse Bernadine Hartman are shown at work.
8. One head of state to visit the new medical center in 1960 was President Charles de Gaulle of France, seen here talking to a young patient and his mother.
9. Gombe West, now defunct, was a chimpanzee colony established in 1970 near Jasper Ridge on campus to study hormones and behavior. Its inhabitants are shown in a typical grooming session.

Inside Nerve Cells: The first successful recordings of electrical signals from inside neurons were achieved by neurologist David Prince and colleagues, allowing a closer look into brain diseases.

Oncology Day Care: The Debbie Probst Oncology Day Care Center opened, more than doubling the center's cancer clinic facilities.

Troubled Wing: The Phase I addition to the hospital opened after delays and cost-overruns for correction of code deficiencies found by state and federal inspectors. The project added 25 intensive care beds and increased facilities for emergency services, X ray, surgical pathology, cardiology and postanesthesia recovery.

New Science Building: The $9.7-million Sherman Fairchild Center, with its 384-seat auditorium, was dedicated. The new structure was built to house an expanded microbiology department and new departments of neurobiology and cell biology.

More Marvels: A computer-based system to help physicians select anti-microbial therapy was developed by Edward Shortliff and colleagues using hardware of SUMEX-AIM (Stanford University Medical Experimental Computer/Artificial Intelligence in Medicine).

Paramedics: Stanford hospital became the regional center for paramedic training, which it had been doing since 1972.

Opioids: Dynorphin, a brain chemical 200 times more powerful than morphine, was discovered by pharmacology professor Avram Goldstein.

Changes: Vice president for medical affairs and dean Clayton Rich resigned to "provide the school with the opportunity for new leadership." Rich made significant progress from 1971 through 1978, particularly in the development of several basic science departments and recruitment of new faculty. But outside fiscal pressures had caused divisions and dif-

FAREWELL

Lowell A. Rantz, M.D., 52. *As head of the division of infectious diseases, he studied relationships between streptococcal infection and rheumatic fever. He helped disseminate and apply this knowledge to prevention efforts sponsored by the American Heart Association. The control of antibiotic resistant organisms and the relation of infection to polynephritis were topics he studied before his untimely death.*

1964

Blake Wilbur, M.D., 72. *He was a founder of the Palo Alto Medical Clinic and a son of Ray Lyman Wilbur, Stanford's president from 1916 to 1943. He was a member of the clinical faculty and his students were interns and residents. A community leader, he was honored for his contributions when a university committee recommended that Blake Wilbur Drive, the road between Pasteur and Quarry Road near the medical center, be named in his honor.*

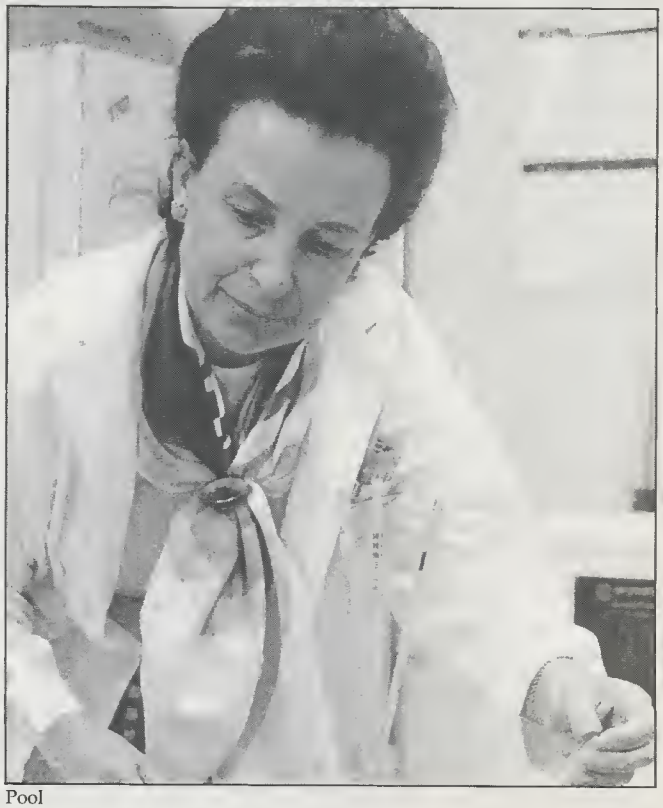
1973

Judith Graham Pool, Ph.D., 56. *A physiologist, she revolutionized the care of the hemophilic patient when she found that the clotting factor could be extracted from normal donor plasma and administered to hemophilia patients who lacked the protein. That major achievement today allows hemophiliacs to live nearly normal lives by treating themselves at home with injections. Gentle, unassertive, she was an inspired leader for her colleagues and students. By sheer force and will in the last years of her life, she worked to improve the role of women in science.*

1975

Emile Frederic Holman, M.D., 87. *"Master surgeon, brilliant scholar, devoted teacher" was how his contemporaries described him. Holman headed Stanford's surgical department from 1925 to 1955 when the school was in San Francisco. His best known published research, "Arteriovenous Aneurysm: Abnormal Communications between the Arterial and Venous Circulations," won him the Gross Prize. He contributed techniques to the treatment of "blue babies" and was the first to perform the operation on the West Coast. In the 30s he conceived the idea of grafting skin. His observations on the rejection phenomenon lay dormant for a quarter century, but they were so important he was honored for his contibutions by the 1972 Congress of the Transplantation Society.*

1977



Pool

25 YEARS

ferences within the school. Deputy dean and hospital chief of staff Lawrence Crowley became vice president for medical affairs.

THE EIGHTIES

Decentralization: Crowley restructured the medical center's administrative organization, with the hospital becoming a subsidiary managed by a board appointed by university trustees as general corporate members. The university clinics were separated from the hospital and the faculty medical practice became self-governing.

Health Policy: A consortium involving nine research programs dealing with national health policy was created, chaired by John Bunker, director of health services research. The members are experts in economics, legislative reform, technology assessment and organization and health care delivery.

Triumvirate: Sheldon King of UC Hospital, San Diego, became associate vice president and director of Stanford University Hospital, succeeding Peter Levin. Donald Tower, director of a group medical practice in Columbia, Mo., was appointed director of Stanford University Clinic, and Dominick Purpura, noted neuroscientist from Albert Einstein College of Medicine, became dean.

Minorities: A 1981 report from the Office of Statewide Health Planning in Sacramento singled out Stanford University School of Medicine as "the model" of how to attract and enroll minority medical students. Stanford's figures showed a minority enrollment of 26.7 percent in the entering class, the top in the state. However, a faculty report released at the same time indicated Stanford medical school had not made much progress in recruitment of minority faculty, and changing the situation was a top priority.

Hodgkin's Disease: Twenty years of Stanford treatment trials for Hodgkin's disease were

Eloesser

Gordon Gould, Ph.D., 68. *Modern treatment for high cholesterol and atherosclerosis owes a great debt to Gould's work. Most of his 20-year career at Stanford was spent helping to unravel the complex sequence by which the liver manufactures and breaks down cholesterol, regulating its level in the blood. An organic chemist, he directed the clinical chemistry laboratory at Stanford University Hospital, in addition to being an ardent conservationist on the Stanford campus.*

1978

Leo Eloesser, M.D., 95. *He was a brilliant thoracic surgeon, world traveler and adventurer. He gained fame for his humanitarian missions to Russia, South America and China before World War II. He was an accomplished violinist and writer, and operated Loyalist field hospitals during the Spanish Civil War. Retired in 1964, Eloesser had built a reputation as an eccentric who often spent long nights sailing San Francisco Bay in his 32-foot sloop, accompanied by his dog and playing the violin.*

1976

Harold Kniest Faber, M.D., 94. *His contributions to pediatrics at Stanford and, in a broader sense, to world pediatrics, were without equal. Known for his polio research, Faber founded Children's Hospital at Stanford and headed the pediatrics department for 26 years prior to retiring in 1949.*

1979

Russel Van Arsdale Lee, M.D., 87. *He founded the Palo Alto Medical Clinic and pioneered in the development of group practice when it was controversial and an anathema to organized medicine. The physician and friend of a succession of Stanford presidents, he supported the school's move from San Francisco to the campus and led the drive to construct the Palo Alto-Stanford Hospital Center as a joint university-city of Palo Alto venture. He worked with the Truman Commission which developed recommendations for prepaid national health insurance and other health legislation. His interest in senior citizens led to the founding of Channing House, but most important, Lee was known as a man who devoted most of his time to his patients.*

1982

Loren "Yank" Chandler, M.D., 88. *Defying the average term for deans of five years, Chandler served in the post for 20 years when Stanford medical school was in San Francisco. He saw the school through the Depression and World War II, and handed diplomas to 21 classes of physicians. When he resigned because of his opposition in 1953 to the school's relocation, he was praised for his notable contributions that lent "distinction to Stanford's place in medicine." An advocate of prepaid medical care, Chandler was instrumental in developing the California Physicians Service and Blue Cross. He had served as president of the Association of American Medical Colleges, and on the AMA commission which studied the British National Health Service in 1950. He concluded it would be "folly" to institute such a plan in the U.S. After the school's relocation, Chandler served as chief of surgery at the Palo Alto Veterans Administration Medical Center, of which he was a key planner.*

1982

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celebrated on campus by more than 800 ex-patients. In no other malignancy have gains been more dramatic, with 85 percent of patients surviving seven years after diagnosis of the cancer, and 75 percent permanently cured. In children, survival rates soar to 96 percent alive after 11 years past diagnosis, with 93 percent of children never experiencing a relapse.

Heart-Lungs: The first successful human combined heart-lung transplant in the world (fourth attempt) was performed by Bruce Reitz, Shumway and colleagues.

Cancer weapons: The first successful use of man-made monoclonal antibodies to treat cancer was reported by oncologist Ronald Levy.

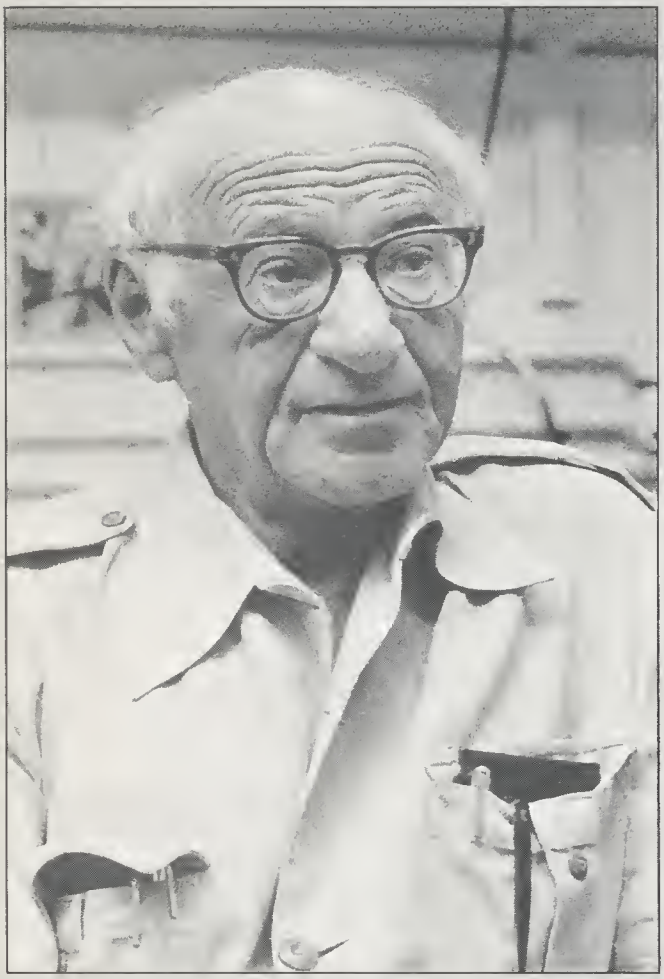
Elusive Gene: A key immune gene, sought unsuccessfully for a decade by researchers around the world, was isolated by microbiologist Mark Davis in collaboration with UC San Diego's Stephen Hedrick and NIH researchers. Gene in hand, scientists believe they can begin to unravel immunity's secrets.

Biclonal Cancer: Jeffrey Sklar and colleagues discovered tumors with two single-cell ancestors in patients with B-cell lymphoma. Tumors, it was thought, began in a single cell that mutated and replicated, producing identical copies. Sklar's discovery has future implications as scientists develop tailor-made anticancer agents called monoclonal antibodies to attack specific cells.

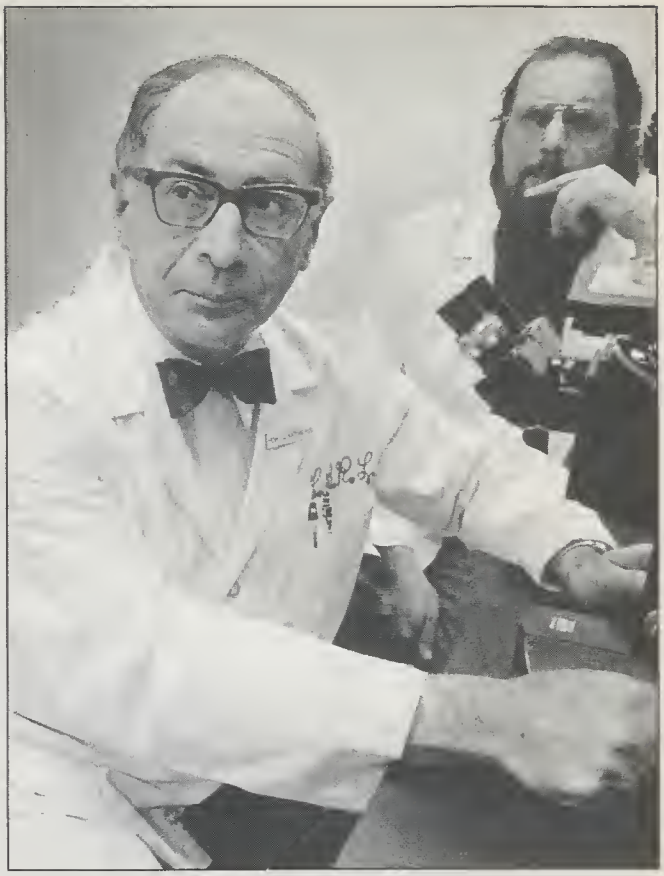
Magnetic Resonance: A new center is planned by the school and hospital to explore diagnostic and research applications of nuclear magnetic resonance, co-invented by Stanford Nobel laureate Felix Bloch. It produces computer-generated images of cross

George A. Feigen, Ph.D., 66. *He was known for research on the immune response. He studied anaphylactic shock—the most severe allergic response—and its effects on heart and blood vessels. An individual of diverse interests and accomplishments, he became a knowledgeable marine biologist. To illustrate his never-flagging curiosity about biological phenomena, his friends said of him: "Whenever George Feigen came across an unfamiliar marine creature in some tidal pool, his first impulse was to make an antibody to it." Most important, Feigen was known as a teacher who commanded respect and demanded the highest standards.*

1983



Feigen



Kaplan

Henry Seymour Kaplan, M.D., 65. *A colossal figure who dominated the field of cancer research and councils of the Stanford medical school for more than a quarter century. As professor and chairman of radiology, he changed Hodgkin's disease from a hopeless illness to one that is more than 90 percent curable when treated early. His science was devoted to understanding the cause of the lymphomas, ultimately discovering the radiation leukemia virus in the mouse, a contribution to what is now appreciated as oncogene research. His search for a potent anticancer weapon was realized in the first medical linear accelerator to be constructed in the Western Hemisphere, proposed by Kaplan and executed by physicist Edward Ginzton at Stanford. Kaplan was a chief architect in the transformation of Stanford University School of Medicine into one of the nation's leading medical centers.*

1984

25 YEARS

sections of the body or a single organ, and can deliver chemical as well as physical information.

Merger: Stanford hospital and Children's Hospital at Stanford (CHAS) agreed to consolidate at a site adjacent to the medical center. The new CHAS, estimated to cost $40 million, is being designed by the San Francisco firm of Anshen and Allen. Pediatric chairman Irving Schulman and faculty are planning new academic programs to strengthen the venture.

Another Casualty: The medical school announced it will terminate its training program in physical therapy after graduation of the present class. The reason: fiscal constraints and changing priorities.

Falk Center: The $14-million Dr. Ralph and Marian Falk Cardiovascular Research Center was dedicated, funded entirely by private gifts in which Friends of Cardiovascular Surgery played a key role.

Molecular and Genetic Medicine: A $45-million center planned to focus on studies of disease at the molecular level will house 35 faculty members and include space leased by the Miami-based Howard Hughes Medical Research Institute for as many as eight faculty supported by Hughes.

Transition: Dean Dominick Purpura resigned to become dean at Albert Einstein College of Medicine, whose neuroscience programs he formerly headed.

Modernization: The first phase of Stanford University Hospital's $110-million modernization began in July, 1984. Initial construction will complete shelled space in the first wing addition to the hospital which opened in 1977.

VOICES

"The university medical center is inevitably a key community resource; it is a referral center with unique programs that complement those of the community at large. It is the locus for pilot programs directed toward the demonstration of better ways to administer health care to our fellow citizens. But if and when the university medical center gets so involved in service loads that these become an end in themselves, efforts in education and research will suffer."

Robert J. Glaser, M.D.
Former Dean

"Medical schools . . . are, like most institutions, social instruments which had better reflect and express society's needs or they will languish for public support, possibly perish, or worst of all, become objects of ridicule and distrust."

William P. Creger, M.D.
Professor of Medicine

"Medical molecules are even more valuable fruits of biomedical investigation than are elegant medical machines like the artificial kidney."

Joshua Lederberg. Ph.D.
Nobel Laureate, Former Chairman and Genetics Professor

"I am afraid of anything that is politically controlled. I don't even like municipally owned railroads or street cars—they cost too much money."

Loren "Yank" Chandler, M.D.
Former Dean

"At its finest, the medical profession can and should liberate one to apply his or her scientific talents together with human concern."

Robert A. Chase, M.D.
Professor of Surgery

"We must have affirmative action programs for scholarship. Otherwise medicine will revert to empiricism, which means it will be approaching witchcraft once again."

Arthur Kornberg, M.D.
Nobel Laureate and Professor of Biochemistry

"Stanford in its educational philosophy has placed great importance in the development of physicians who will have an analytical approach toward medicine—whether they choose to become academicians or practitioners."

Clayton Rich, M.D.
Former Dean

"I detect an increasing trend of concern on the part of medical students with learning more about how patients are taken care of in the milieu of their everyday lives."

Erling W. Fredell, M.D.
Clinical Associate Professor of Medicine

"We have tried to do all things for medical and social problems over which we have no control and which are not the function of a university medical school. The problems related to Medi-Cal and Medicare and their destructive effects on the financing of the medical school are a contemporary disaster. Should we not have refused to accept these responsibilities?"

Roy Cohn, M.D.
Professor of Surgery Emeritus

"In a sense the federal government is directly responsible for the high level of progress in heart transplantation which today it feels constrained to evaluate with respect to ethical, social, legal, economic and political implications."

Norman E. Shumway, M.D.
Professor of Cardiovascular Surgery

"President Nixon and the entire Congress have declared that cancer will be cured....Unfortunately, no firm (scientific) base for the development of a centrally directed cancer program currently exists. The net result to cure cancer may well be to slow down rather than speed up progress."

Leonard Herzenberg, Ph.D.
Professor of Genetics

"I've always been a great house-call man. The only real participation a doctor gets is when he sits on the side of the bed and boils his hypos in the bathroom and that sort of thing. It's the most rewarding of human experiences."

Russel V. Lee, M.D.
Clinical Professor of Medicine and Founder, Palo Alto Medical Clinic

"I believe it is a mark of disrespect to both the patient and the physician for students to dress inappropriately, to smoke in their presence, to eat or drink food during the presentation, to read the newspaper, or to otherwise display unprofessional behavior."

Joseph P. Kriss, M.D.
Professor of Medicine and Radiology

This sculpture honoring Dr. Henry Kaplan is situated in front of the medical center. The artist, renowned Cubist Jacques Lipchitz, called it "Song of the Vowels." He created it, he once said, to attempt to suggest the power of man over nature.

Kaplan, internationally known for his work in radiology and cancer research, said shortly before his death that he thought one of his greatest accomplishments was helping to develop a treatment program to overcome Hodgkin's disease, formerly a fatal cancer.

The sculpture depicts the theme of twin harpists, and art critics say it celebrates Lipchitz' optimism about humanity's power to triumph over adversities encountered in nature.

Kaplan had expressed his admiration for and ability to identify with Lipchitz' work.

Stanford University

Office of Public Events
Stanford University Medical Center
750 Welch Road, Suite 300
Palo Alto, California 94304